

ABSTRACT

The present invention realizes a reliable heat pump apparatus and heat pump apparatus having high recovering efficiency. The heat pump apparatus includes an expander 711 for expanding working fluid, a permanent magnet type synchronization power generator 710 which is disposed for recovering power by the expander 711 and which generates three phase AC power, and a first converter 708 which converts the AC power to DC power, and which rotates the power generator 710 at a predetermined target number of revolutions by switching of a switching element group 709. The generated electricity is consumed by connection of an AC power supply 701 to a DC power line which is rectified and smoothened by a rectifier circuit 702 and a smoothing capacitor 703, and by driving of an electric motor 706 which rotates a compressor 707 through a motor drive apparatus 704, and the power is efficiently recovered.